Physico-chemical and Functional properties of Rutin induced Chitosan/Poly (vinyl alcohol) Bioactive Films for Food Packaging Applications

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Abstract

Rutin induced Chitosan/Poly (vinyl alcohol) bioactive films were developed by using solvent casting technique. The effect of various concentrations (0.2, 0.4 and 0.6%) of rutin on physico-chemical and functional properties of bioactive films were studied and analysis results indicated that presence of rutin improved the barrier to UV-light, WVP, OTR, water resistance, water solubility and thermal properties. The results of water contact angle, FTIR and SEM showed that addition of rutin increased the network compactness of the bioactive films which resulted from strong intermolecular interactions through hydrogen bonding. Stress-strain curves demonstrated that the incorporation of 0.6% of rutin gives maximum values of TS, %EB and YM as 54 ± 1 MPa, 51 ± 1.5 % and 1423 ± 13.2 MPa, respectively. Bioactive films showed strong antimicrobial activity against *E. coli* and *S. aureus* bacteria. The overall migration of components of bioactive films in different food simulants were within the permitted limits of 10 mg/ml. Hence, rutin induced CS/PVA bioactive films have potential to be used for improving food quality and extending the shelf life of food.

Key Words: Poly (vinyl alcohol), Chitosan, Rutin, Bioactive films, Food packaging.

1. Introduction

The exploration of bioactive compounds in food packaging has received increasing attention in recent years due to consumer concerns about the use of synthetic preservatives. The bioactive compounds used for the development of food packaging are mainly nontoxic, used as protective materials to maintain the quality and extend shelf life of food (Arismendi, et al., 2013). Organic acids, essential oils, fatty acids, fruit and plant extracts, agricultural waste products etc. are all